

**GRIP TIP OF GRIPPER FOR PARTS HAVING DIFFERENT SHAPE IN  
SURFACE MOUNT DEVICE**

**BACKGROUND OF THE INVENTION**

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Field of the Invention

10 The present invention relates to a grip tip of a gripper for a parts having a different shape in a surface mount device, and in particular to an improved grip tip which can be easily attached/detached to/from a gripper for picking up a parts having a different shape, transferring the parts to a printed circuit board, and mounting the parts on the printed circuit board, and which can firmly support the parts, when a surface mount  
15 device mounts the parts on the printed circuit board.

Description of the Background Art

A surface mount device is used to rapidly precisely mount a plurality of parts on a printed  
20 circuit board. A structure of the surface mount device for rapidly precisely mounting parts on the printed circuit board will now be explained with reference to the accompanying drawings. Figure 1 is a plan view illustrating the surface mount device. As shown therein,  
25 the surface mount device 10 includes an X-Y gantry 11, a printed circuit board conveyor 12, a module head 13 and a nozzle exchanging apparatus 14.

The X-Y gantry 11 transfers the module head 13 in an X-Y axis direction. The module head 13 transferred by the X-Y gantry 11 in the X-Y axis direction transfers a parts to a printed circuit board 1. The printed circuit board 1 is transferred to a mounting operation position A by the printed circuit board conveyor 12. When the printed circuit board 1 is transferred to the mounting operation position A by the printed circuit board conveyor 12, the module head 13 sucks the parts, transfers the parts to the printed circuit board 1, and mounts the parts on the printed circuit board 1.

The module head 13 sucking the parts and transferring the sucked parts to the printed circuit board 1 includes a plurality of nozzle devices 20. A structure of the nozzle device 20 will now be explained with reference to Figure 2. Referring to Figure 2, the nozzle device 20 includes a socket unit 21 and a holder unit 22. The socket unit 21 includes a hollow shaft 21a, an assembly block 21b, a connection block 21c, a socket shaft 21d and an elastic member 21e. The holder unit 22 includes a holder 22a and a holder shaft 22b.

The hollow shaft 21a of the socket unit 21 has a hollow, and the connection block 21c is installed by the assembly block 21b on the bottom surface of the hollow shaft 21a. The holder 22a of the holder unit 22 is provided in the connection block 21c installed by the assembly block 21b. The socket shaft 21d and the elastic

member 21c are disposed at the bottom surface of the connection block 21c in order to firmly and detachably support the holder 22a installed in the connection block 21c.

5           The socket shaft 21d of the connection block 21c is supported at both side portions of the connection block 21c by the elastic member 21e. The socket shaft 21d installed at both side portions of the connection block 21c by the elastic member 21e supports both side  
10 portions of the holder 22a of the holder unit 22 in installation. The holder shaft 22b is formed on the bottom surface of the holder 22a having its side portions supported by the socket shaft 21d.

          When the holder 22a is installed in the connection  
15 block 21c, a nozzle (not shown) is mounted on the holder shaft 22b. In this state, a component is sucked by the nozzle, transferred to the printed circuit board 1, and mounted thereon. To replace the holder unit 22, the socket unit 21 is moved to a nozzle exchanging apparatus  
20 (14 in Figure 1), and rapidly moved in a vertical direction to pick up the holder unit 22, thereby mounting and replacing the holder unit 22. The nozzle (not shown) is mounted inside of the holder shaft 22b of the replaced holder unit 22.

25           The nozzle is formed to pick up a surface mounting parts having a constant shape and size and to mount the parts on the printed circuit board. Accordingly, a

gripper is used to pick up a parts having a different shape and size. However, the conventional gripper does not firmly pick up the parts having the different shape and size, and is not easily attached or detached.

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#### **SUMMARY OF THE INVENTION**

Accordingly, it is a primary object of the present invention to provide a grip tip which can firmly support  
10 a parts having a different shape and which can be easily attached/detached to/from a gripper for the parts having the different shape in a surface mount device, when the gripper mounts the parts on a printed circuit board.

Another object of the present invention is to  
15 provide a grip tip which can firmly pick up a parts having a different shape, easily mount the parts on a printed circuit board, and be easily attached/detached to/from a gripper.

In order to achieve the above-described objects of  
20 the invention, there is provided, in a surface mount device including a holder mounted in a socket unit to be adhered closely to a socket shaft by an elastic force of an elastic body connected to the socket shaft, a grip tip of a gripper for a parts having a different shape  
25 adapted to the surface mount device comprising: a piston installed inside of a through hole formed at the holder, and lifted or lowered by air flown in/out through the

through hole; a moving unit adjacently positioned to an inner slanted surface of a slanted member formed on the bottom surface of the piston, and connected to fixed blocks of the holder by a connection means for increasing or decreasing an interval according to the lifting or lowering operation of the piston; and a plurality of grip tips provided to moving blocks of the moving unit through a fixed member, for supporting at least three points of a parts having a different shape.

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#### **BRIEF DESCRIPTION OF THE DRAWINGS**

The present invention will become better understood with reference to the accompanying drawings which are given only by way of illustration and thus are not limitative of the present invention, wherein:

Figure 1 is a plan view illustrating a surface mount device;

Figure 2 is a perspective view illustrating a conventional nozzle device in Figure 1;

Figure 3 is an exploded view illustrating gripper for a parts having a different shape in accordance with the present invention;

Figure 4 is a perspective view illustrating an assembly state of a grip tip in Figure 3;

Figure 5 is a plan view illustrating the grip tip in Figure 4; and

Figure 6 is a side cross-sectional view illustrating the grip in Figure 4.

#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

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A grip tip of a gripper for a parts having a different shape in a surface mount device in accordance with a preferred embodiment of the present invention will now be described in detail with reference to the accompanying drawings.

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Figure 3 is an exploded view illustrating a gripper in accordance with the present invention, Figure 4 is a perspective view illustrating an assembly state of the grip tip in Figure 3, and Figure 5 is a plan view illustrating the grip tip in Figure 4.

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Referring to Figures 3 to 5, the surface mount device includes: a holder 110 mounted in a socket unit to be adhered closely to a socket shaft by an elastic force of an elastic body connected to the socket shaft; a piston 120 installed in a through hole 110a formed at the holder 110, and lifted or lowered by air flown in/out through the through hole 110a; a moving unit 130 adjacently positioned to an inner slanted surface of a slanted member 121 formed on the bottom surface of the piston 120, and connected to fixed blocks 111 of the holder 110 by a connection unit for increasing or decreasing an interval according to the lifting or

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lowering operation of the piston 120; and a plurality of grip tips 140 provided to moving blocks 131 of the moving unit 130 through wrench bolts 143, for supporting at least three points of a parts having a different shape.

The plurality of grip tips 140 respectively include assembly blocks 141 fixed to the moving blocks 131 of the moving unit 130, and tips 142a and 142b formed on the bottom surface of the assembly blocks 141.

In the tips 142a and 142b, the first tip 142a is disposed at one assembly block 141 and has a concave region 142c, and the second tip 142b is disposed at the other assembly block 141 and has a convex region 142d. A slanted surface 135 is formed at the center portion of the moving block 131 of the moving unit 130, is contacted with the inner slanted surface of the slanted member 121, so that when the piston 120 is lifted, the interval between the moving blocks 131 is decreased and when the piston 120 is lowered, the interval between the moving blocks 131 is increased.

The connection unit includes: a plurality of guide shafts 132 for penetrating and mounting the moving blocks 131 between the two fixed blocks 111; elastic members 133 installed on the outer surfaces of the guide shafts 132, for applying an elastic force in a direction of increasing an interval between the moving blocks 131; and snap rings 134 inserted into both ends of the guide

shafts 132, for preventing the guide shafts 132 from being separated from the fixed blocks 111.

The structure and operation of the present invention will now be explained in more detail.

5       The grip tips 140 are transferred to face each other, and air is externally flown in/out through the holder 110 to pick up a component having a different shape and size. The holder 110 has one end positioned inside of the holder unit (22, shown in Figure 2). The  
10       through hole 110a having a predetermined diameter is formed in the holder 110 to form a path of air flown in/out through the holder unit 22. The fixed blocks 111 face each other at the other end of the holder 110 having the through hole 110a. Here, the fixed blocks 111  
15       are separated from each other by a predetermined distance in order to fix the moving blocks 130.

      The piston 120 is installed inside of the through hole 110a of the holder 110. The moving unit 130 is fixed to the fixed blocks 111. The piston 120 installed  
20       inside of the through hole 110a of the holder 110 is lifted or lowered in a vertical direction due to an air pressure flown in/out through the through hole 110a. The slanted member 121 is formed integrally to the bottom surface of the piston 120 lifted or lowered in the  
25       through hole 110a.

      The slanted member 121 of the piston 120 is contacted to a slanted surface 135 of the moving unit



130, and slid along the surface of the slanted member 121 according to the lifting or lowering operation of the piston 120, for transferring the moving unit 130 in a horizontal direction. That is, when air is flown in through the through hole 110a of the holder 110, the piston 120 is lowered due to air. The slanted member 121 is lowered according to the lowering operation of the piston 120, the slanted surface 135 of the moving unit 130 is moved along the surface of the slanted member 121, so the moving unit 130 is moved to decrease the interval. Conversely, when air is not flown in, the moving unit 130 is moved by the elastic members 133 in a direction increasing an interval between the slanted surfaces 135, thereby lifting the piston 120. Here, the elastic members 133 are installed in the guide shafts 132 of the moving unit 130.

The moving unit 130 laterally moved in a direction decreasing or increasing the interval due to the lifting or lowering operation of the piston 120 includes the moving blocks 131, the guide shafts 132 and the elastic members 133. The moving blocks 131 of the moving unit 130 are installed in the fixed blocks 111 at both side portions of the other end of the holder 110. The guide shafts 132 are provided between the moving blocks 131. Here, the elastic members 133 are respectively positioned on the outer surfaces of the guide shafts 132. The snap rings 134 are fixedly disposed at both ends of

the guide shafts 132 and between the moving blocks 131 and the fixed blocks 111.

The guide shafts 132 respectively installed between the moving blocks 131 and the fixed blocks 111 guide the lateral movement of the moving blocks 131. When the moving blocks 131 are laterally moved to be adjacent to each other and then moved to be far from each other, the elastic members 133 of the guide shafts 132 return the moving blocks 131 to original positions thereof with the elastic force.

The grip tips 140 are installed in the moving blocks 131 of the moving unit 130 laterally moved to be adjacent to or far from each other by the wrench bolts 143. The grip tips 140 include the plurality of assembly blocks 141 and the plurality of tips 142a and 142b. The plurality of assembly blocks 141 are installed to the moving blocks 131 by the wrench bolts 143. The wrench bolts 143 are used to replace the grip tips 140, thereby precisely installing the grip tips 140 without an assembly error.

The plurality of tips 142a and 142b easily attached/detached to/from the moving unit 130 by the wrench bolts 143 include the first tip 142a and the second tip 142b. As illustrated in Figure 6, the first tip 142a has the concave region 142c and the second tip 142b has the convex region 142d.

The concave region 142c and the convex region 142d

of the first and second tips 142a and 142b are used to support the three points of the parts having the different shape. That is, in the case of the parts which does not have a horizontal or vertical surface, the concave region 142c and the convex region 142d support at least three points of the parts, thereby firmly picking up the parts.

As described above, the first tip and the second tip are connected to the moving unit by using the wrench bolts, and thus easily attached/detached to/from the moving unit. In addition, the first and second tips have the concave and convex regions, respectively, to firmly support the parts having the different shape.

As discussed earlier, in accordance with the present invention, in the grip tip of the gripper for the parts having the different shape in the surface mount device, the first tip and the second tip are connected to the moving unit by using the wrench bolts, and thus easily attached/detached to/from the moving unit. Moreover, the first and second tips have the concave and convex regions, respectively, to firmly support the component having the different shape.

As the present invention may be embodied in several forms without departing from the spirit or essential characteristics thereof, it should also be understood that the above-described embodiment is not limited by any of the details of the foregoing

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